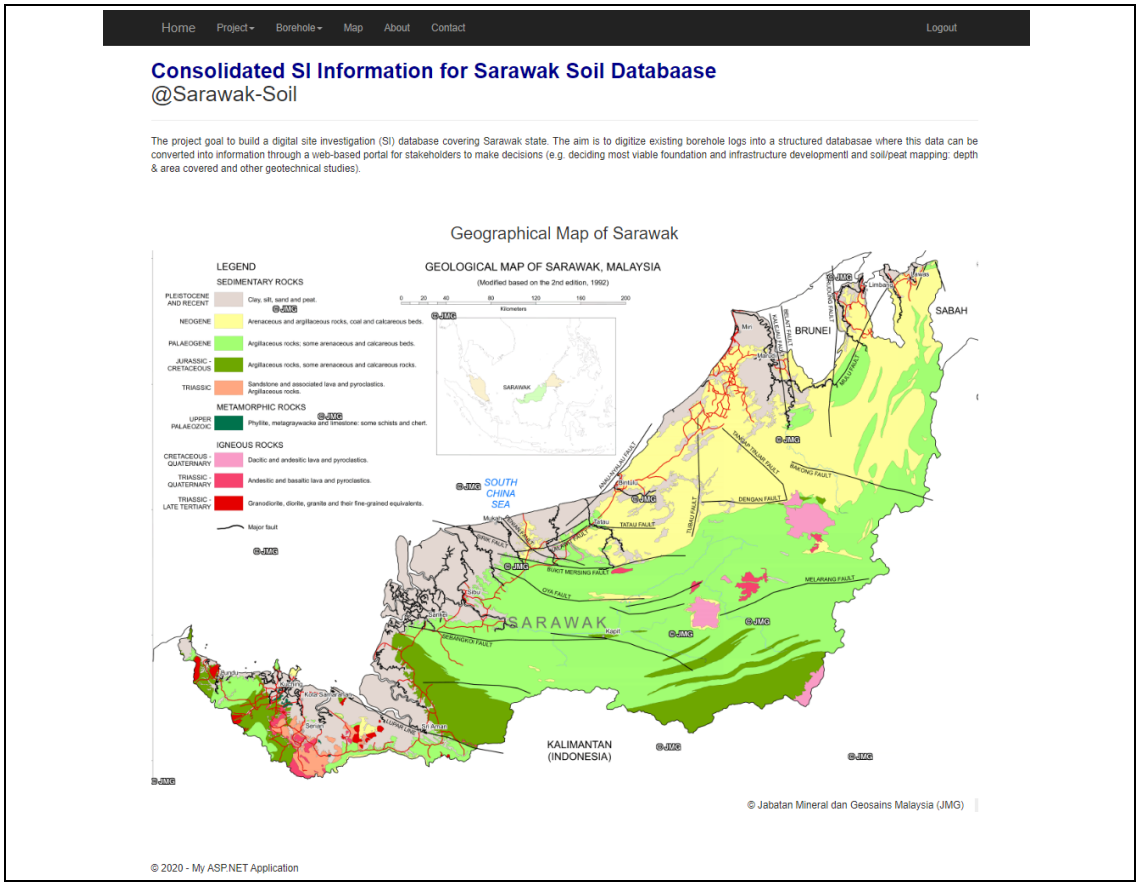
FINAL REPORT
SARAWAK DIGITAL RESEARCH GRANT



TITLE OF RESEARCH	:	**Consolidated SI Information for Sarawak Soil Database**
Project Leader	:	**Ir. Dr Norazzlina Bt M.Sa'don**
Project Members	:	Ir. Dr Abdul Razak Bin Abdul Karim (FEng) Dr Bong Chih How (FCSIT) Prof Madya Ir Dr Siti Noor Linda Bt Taib (FEng) Dr Stephanie Chua Hui Li (FCSIT) Dr Alsidqi Hasan (FEng) Ahmad Kamal Bin Abdul Aziz (FEng) Linda Wong Lin Juan (RO-FCSIT) Louisa Dubah Anak Hubert Chunggat (RO-FEng)
IPTA/ Faculty	:	Universiti Malaysia Sarawak (UNIMAS) • Faculty of Engineering (FEng) & • Faculty of Computer Science and Information Technology (FCSIT)
E-Mail	:	msazzlin@unimas.my
Research Sector	:	Infrastructure

ABSTRACT
The development of digitized Consolidated Sarawak Geotechnical Site Investigation (CoSI) database @Sarawak-Soil aims to enable information to be stored in a digital format rather than static images and retrieved fast with the efficient search. The CoSI database is a function of a database management system, which consists of the site information; includes the project name, location (division), borehole logs, field and laboratory test results. A data entry template was designed for the conversion of all the existing hard copies of boreholes information and future new collected borehole logs into a soft-copy format. This CoSI database is deployed as a web-based system which provides various opportunities to explore the published data and can be accessed anywhere through the computer and smart phones with internet access.

1. INTRODUCTION
The geotechnical site investigation (SI) is routinely performed to the commencement of any projects prior to the proper design, the efficient and economical construction of all civil engineering and building works. The geotechnical engineers will be interpreting the subsurface conditions based on the SI report for both planning and design stages as well as during construction. The SI plays an important role, where the inadequate characterization of the subsurface conditions will contribute to either a significantly over-designed solution, thereby increasing the project cost, or an under-designed, which lead to potential failures. It is also helps to overcome any possible difficulties delays that may arise during construction period, disputes, claims and project cost overruns due to ground and other local conditions (Zumrawi, 2012 and Jaksa et.al 2003).

In this study, the geotechnical SI reports are gathered mostly from the Public Works Department (PWD) Sarawak. The PWD has collected a large amount of the SI report in hardcopy version over the years and it keeps increasing continually, which caused lots of spaces needed and required a systematic recording system. Also, the data retrieval is time consuming and often frustrating, especially when the SI report/data needed cannot be found (Sahadan and Seman, 2003). Following to this, the PWD Sarawak has developed a system called Geotechnical Site Information System for Sarawak (GEOINFOS) to store the boreholes, field and laboratory tests. In the system, a GIS map of an area links to images of boreholes, which are scanned images of existing boreholes, which function as a document management system rather than as a database management system. Kunapo et al. (2005) stated that because of the data are stored as images instead of digital form; the data cannot be used for advanced analyses such as building 3-D subsurface images, generation of cross sections and geostatistical analyses. Therefore, it would be useful to develop the geotechnical information in digital form and distributes information over the internet.

2. RESEARCH METHODOLOGY
The present study aims to produce digitized Consolidated Sarawak Geotechnical Site Investigation report into a database management system, which enables data to be retrieved fast and cost-effective tools to promote accessibility, efficient distribution, and effective administration of geotechnical data. In addition, the current system developed not only focusing on the compilation of the previous hardcopy SI report, but, also allow the user to key-in the new collected borehole logs that serve potential users who requiring geotechnical information. The objectives of the current study are outlined as follows:

- To collect, compile and digitized all reliable Sarawak Geotechnical SI information from the data providers; local government agencies (PWD), private developers and other civil engineering consultants and/or contractors;
- To construct intelligent software to facilitate the stored Geotechnical SI information for future decision making with minimum requirement to perform detailed SI and early identification of the potential areas for future development; and
- To develop a web-based application that allows users to search, view and provide downloadable data of the available ground information efficiently.

3. LITERATURE REVIEW

Geotechnical site investigation helps to identify the possible geotechnical problems with the aim to provide adequate information for site assessment, in order to have safe and economical designs. Inadequate in geotechnical SI information is often the result of designer failing to properly plan and identify the type of field and laboratory testing needed to acquire soil parameters used for the design. A quality geotechnical evaluation of a project site can save a project considerable time and expenses, by providing the design team and contractors with the subsurface information and design parameters during the initial design and planning stages. The risk of a construction failure is dependent on the information obtained from the geotechnical site investigation, which aimed at characterizing the underlying soil conditions (Goldworthy, 2004). Figure 1 presents the relationship between the site investigations with other related geotechnical works.

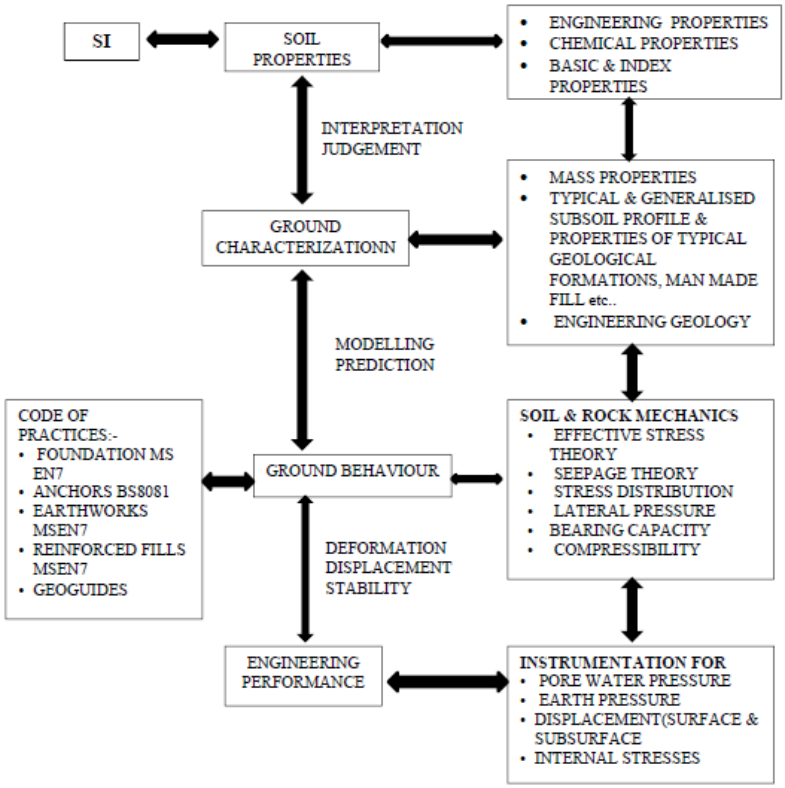


Figure 1 The relationship between SI and other related geotechnical works (Nazir, 2014)

Several studies have been published over the last 30 years or so clearly demonstrate that, in civil engineering projects, the largest element of financial and technical risk usually lies in the ground (National Research Council 1984, Institution of Civil Engineers 1991, Littlejohn et al. 1994, Whyte 1995). As a result, the geotechnical data obtained from limited characterization of ground conditions can be both inadequate and/or inappropriate. This situation can lead to failure and a high level of financial and technical risk (Institution of Civil Engineers 1991; Littlejohn et al. 1994; National Research Council 1984; Temple and Stukhart 1987) (quoted from Nazir, 2014). In general, good geotechnical SI information involves a proper reporting borehole logs, material sampling, laboratory and field testing results. Thus, to maximizing the benefit of geotechnical information, a document management system is needed to replace with the electronic version. The geotechnical SI reports are electronically upload, store and available to access, which creating a means for field engineers and authorized consultants using the system. According to Okunade (2010) the geotechnical databases has been developed for units of different area ranging from individual project sites, to cities or municipal areas, counties, states countries and regions consisting of several countries or whole continents.

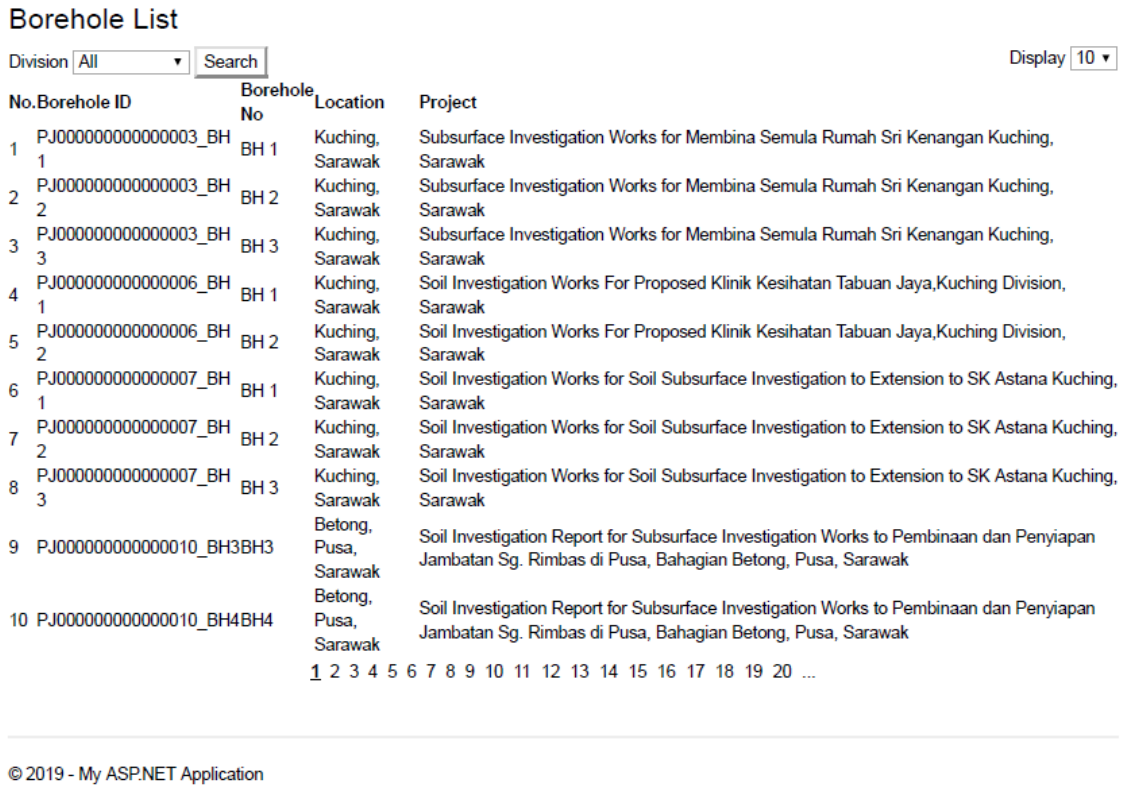
4. FINDINGS

4.1. Overview of the System Development

This project consists of 3 main phases. They are the data collection interface, open street map data display and interpolation of soil stratigraphy. The data collection interface allows the user to key in all the borehole data in the web form allows the user to retrieve all the input data and allows the user to download printed data. Open street map data display retrieves data that user input and plot their location on the open street map according to the coordinate. An interpolation of soil stratigraphy uses the soil stratigraphy information for each borehole log and visualizes the stratigraphy of the borehole logs in 2D. The system is a secure website that requires a valid username and password. Once logged in, the main web interface of the Consolidated SI Information for Sarawak Soil Database @Sarawak-Soil will be available with seven buttons: Home, Project, Boreholes, Map, About, Contact and Logout. Each of these buttons allows a user access to different functionality. These functions allow users to viewing and searching a map as well as searching the borehole log data through several convenient approaches search through; project name, borehole list and division as presented in Figure 2. The map function on the homepage opens a new window that displays the Street Map. The Street view shows a map containing streets, street name and the location of a borehole is link on the street map as illustrated in Figure 3. The map is equipped with zoom and pan functionality and access by a click on the blue balloon will open the associated Geotechnical SI information.

4.2. Design and Implementation

A data entry template was designed in web forms (refer Figure 4) for the conversion of all the existing hard copies of boreholes information and future new collected borehole logs into a soft-copy format. In brief, the web-based of the Consolidated Sarawak Geotechnical SI database system @Sarawak-Soil covers 8 divisions which are Kuching, Lundu, Sematan, Sibu, Kapit, Sarikei, Bintulu, Miri, Lawas and Limbang. Users are able to view the information for each borehole log from the website through the computer and smart phones with internet access.


Borehole List

Division All Search

Display 10

No.	Borehole ID	Borehole No	Location	Project
1	PJ000000000000003_BH1	BH 1	Kuching, Sarawak	Subsurface Investigation Works for Membina Semula Rumah Sri Kenangan Kuching, Sarawak
2	PJ000000000000003_BH2	BH 2	Kuching, Sarawak	Subsurface Investigation Works for Membina Semula Rumah Sri Kenangan Kuching, Sarawak
3	PJ000000000000003_BH3	BH 3	Kuching, Sarawak	Subsurface Investigation Works for Membina Semula Rumah Sri Kenangan Kuching, Sarawak
4	PJ000000000000006_BH1	BH 1	Kuching, Sarawak	Soil Investigation Works For Proposed Klinik Kesihatan Tabuan Jaya,Kuching Division, Sarawak
5	PJ000000000000006_BH2	BH 2	Kuching, Sarawak	Soil Investigation Works For Proposed Klinik Kesihatan Tabuan Jaya,Kuching Division, Sarawak
6	PJ000000000000007_BH1	BH 1	Kuching, Sarawak	Soil Investigation Works for Soil Subsurface Investigation to Extension to SK Astana Kuching, Sarawak
7	PJ000000000000007_BH2	BH 2	Kuching, Sarawak	Soil Investigation Works for Soil Subsurface Investigation to Extension to SK Astana Kuching, Sarawak
8	PJ000000000000007_BH3	BH 3	Kuching, Sarawak	Soil Investigation Works for Soil Subsurface Investigation to Extension to SK Astana Kuching, Sarawak
9	PJ000000000000010_BH3	BH3	Betong, Pusa, Sarawak	Soil Investigation Report for Subsurface Investigation Works to Pembinaan dan Penyiapan Jambatan Sg. Rimbas di Pusa, Bahagian Betong, Pusa, Sarawak
10	PJ000000000000010_BH4	BH4	Betong, Pusa, Sarawak	Soil Investigation Report for Subsurface Investigation Works to Pembinaan dan Penyiapan Jambatan Sg. Rimbas di Pusa, Bahagian Betong, Pusa, Sarawak

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 ...

© 2019 - My ASP.NET Application

Figure 2 Screenshot of the interface of compilation projects for Geotechnical SI database system

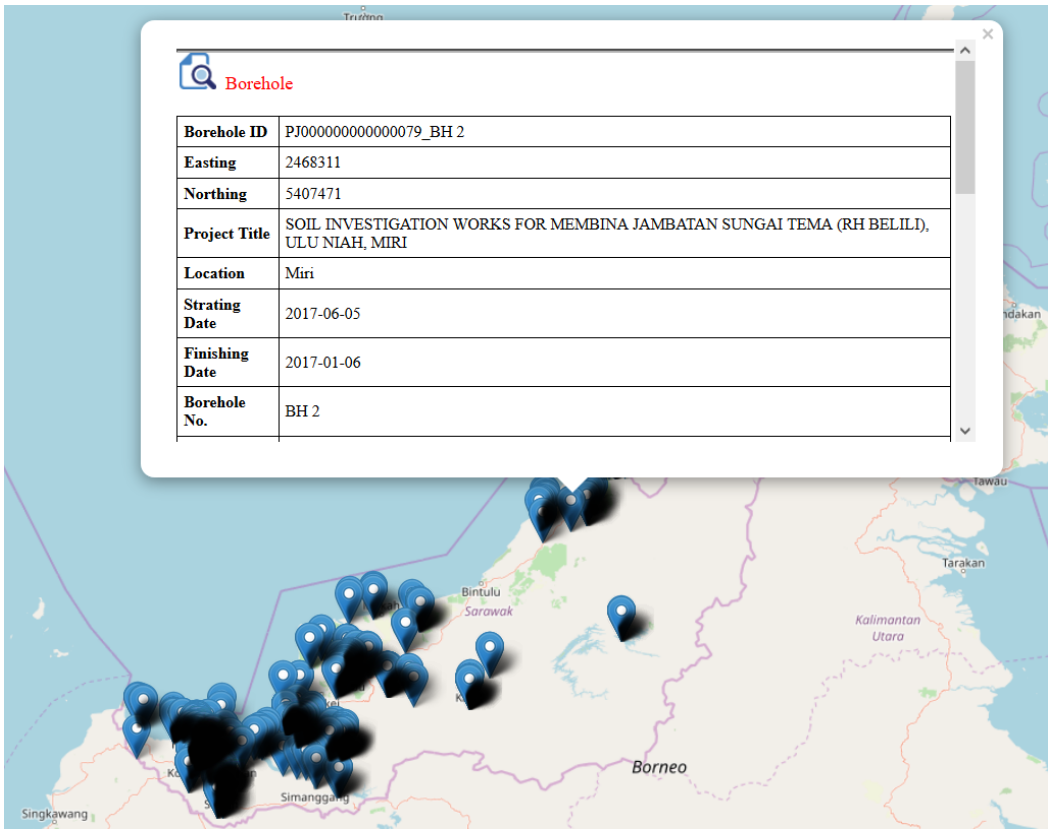


Figure 3 Digitalized Boreholes of Sarawak Geotechnical Soil Database @Sarawak-Soil

Note: # By clicking one of the balloon buttons on the street map, the Geotechnical SI information will be displayed.

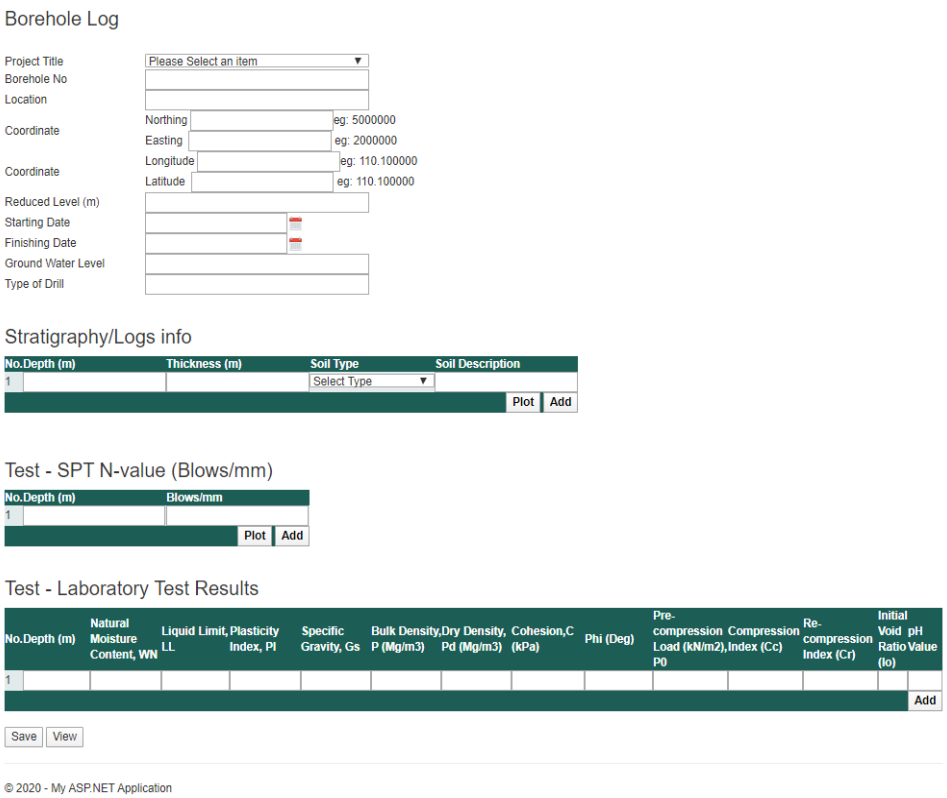


Figure 4 Data entry web-page

5. CONCLUSION

The Consolidated Sarawak Geotechnical SI database system @Sarawak-Soil comes with numerous tools; SI information: borehole logs data visualization, material sampling, laboratory and field testing results, interpolations, and able to be search in multiple platform via smartphones and web. This digitized database system is a secure website that will be very significant to the local government agencies, civil engineering consultants, contractors, universities, researchers and policy makers in planning, and making cost effective decisions. The system focuses on digitizing the geotechnical database management system that is spatially located using Street map. Future upgrade of the system will include prediction of soil stratigraphy, geotechnical analysis tools and integration with other available relevant document management system.

ACHIEVEMENT

i) Name of articles/ manuscripts/ books published
A Web-Based Consolidated Geotechnical SI of Sarawak Soil – to be submitted to *Computer-Aided Civil and Infrastructure Engineering*

ii) Title of Paper presentations (international/ local)
Consolidated Sarawak GeotechnicalSI (CoSI) Database Development – submitted for publication to*13th International UNIMAS Engineering Conference (EnCon2020).*

iii) Human Capital Development
N/A

iv) Awards/ Others
Bronze Award – Consolidated SI Information for Sarawak Soil Database, *Innovation Technology Expo (InTEX19): Research –Driven Innovation and Technology*, Imperial Hotel, Kuching, Sarawak, 24-25 July 2019

v) Others
Intellectual Property: Consolidated SI Information for Sarawak Database – Copyright (CRLY00021650)

REFERENCES

[1] Zumrawi, M. (2012). Effects of Inadequate Geotechnical Investigation on Civil Engineering Projects, *International Journal of Science and Research (IJSR)*, Vol. 3, Issue 6, pg 927-931.

[2] Jaksa, M. B., Kaggwa, W. S., Fenton, G. A. and Poulos, H. G. (2003). A Framework for quantifying the realibility of geotechnical investigations. *9th International Conference on Statistics and Probability in Civil Engineering.* San Fransisco, USA.

[3] Sahadan, J. and Busiai, S. (2003). Geotechnical site information system for Sarawak (GEOINFOS). *2nd International Conference on Advances in Soft Soil Engineering and Technology*. 2-4 July 2003, Putrajaya, Malaysia.

[4] Kunapo, J., Dasari, R.G., Phoon, K.K., and Tan, T.S. (2005). Development of Web-GIS based Geotechnical Information System. *Journal of Computing in Civil Engineering.* Vol. 19, pp. 323-327.

[5] Goldworthy, J. S., Jaksa, M. B., Kaggwa, W. S., Fenton, G. A., Griffiths, D. V., and Poulos, H. G. (2004). Cost od failures due to limited site investigations. *Proceedings of International Conference on Structural and Foundations Failures*. 2-4 Aug, Singapore, pp.398-409.

[6] Nazir, R. (2014). Managing geotechnical site investigation work – Getting away from old practice. *Annual Conference on Social Studies, Communication and Education (ACSSC) and Asia-Pacific Social Science Conference (APSSC).* 7-9 Nov, Kuala Lumpur, Malaysia.

[7] Okunade, E. A. (2010). Design and implementation of a Web-Based geotechnical database management system for Nigerian Soils. *Modern Applied Science*. Vol. 4, No. 11, pp. 1913-1852.

APPENDIXES

a) Article - A Web-Based Consolidated Geotechnical SI of Sarawak Soil (*First Page*)
b) InTEX2019 – Extract Proceeding, Poster, Award Certificate
c) EnCON2020 – Consolidated Sarawak Geotechnical SI (CoSI) Database Development (*First Page*)
d) IP – Copyright: LY2019007026

BUDGET

NO	VOTE	AMOUNT APPROVED (RM)	TOTAL EXPENSES (RM)	PERCENTAGE (%)
1	V11000	60,000.00	66,063.00	100.00
2	V14000			
3	V21000	3,000.00	2,000.00	66.67
4	V22000			
5	V23000			
6	V24000	3,000.00		0.00
7	V26000			
8	V27000	2,000.00	1,959.18	97.91
9	V28000			
10	V29000	14,800.00	14,800.00	100.00
11	V35000	17,200.00		
TOTAL		**100,000.00**	**84,822.18**	**84.82**

A Web-Based Consolidated Geotechnical SI of Sarawak Soil

Norazzlina M.Sa'don*, Abdul Razak Abdul Karim

Faculty of Engineering, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

&

Bong Chih How, Linda Wong Lin Juan

Faculty of Computer Science and Information Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

Abstract: *The Geotechnical SI plays an important role, where the inadequate characterization of the subsurface conditions will contribute to either a significantly over-designed solution, which is cost-effective, or an under-designed, which lead to potential failures. This project is intended to realize a web-based application to allow users to search borehole, view bore-logs and provides digital downloadable boreholes data of the available ground information in a standard format for analysis. At current most of the SI data are available in the form of hardcopy reports, which is time consuming and often frustrating, particularly when the required report or data cannot be found. The web-based Geotechnical Site Investigation (SI) of Sarawak Soil database system is stored in a digital format rather than as static images. This provides many opportunities to explore the data, and can be accessed anywhere through the computer and smart phones with internet access.*

1 INTRODUCTION

Geotechnical site investigation helps to identify the possible geotechnical problems with the aim to provide adequate information for site assessment, in order to have safe and economical designs. Inadequate in geotechnical SI information is often the result of designer failing to properly plan and identify the type of field and laboratory testing needed to acquire soil parameters used for the design.

A quality geotechnical evaluation of a project site can save a project considerable time and expenses, by providing the design team and contractors with the subsurface information and design parameters during the initial design and planning stages. The risk of a construction failure is dependent on the information obtained from the geotechnical site investigation, which aimed at characterizing the underlying soil conditions (Goldworthy, 2004).

Several studies have been published over the last 30 years or so clearly demonstrate that, in civil engineering projects, the largest element of financial and technical risk usually lies in the ground (National Research Council 1984, Institution of Civil Engineers 1991, Littlejohn et al. 1994, Whyte 1995). As a result, the geotechnical data obtained from limited characterization of ground conditions can be both inadequate and/or inappropriate. This situation can lead to failure and a high level of financial and technical risk (Institution of Civil Engineers 1991; Littlejohn et al. 1994; National Research Council 1984; Temple and Stukhart 1987) (quoted from Nazir, 2014). In general, good geotechnical SI information involves a proper reporting borehole logs, material sampling, laboratory and field testing results.

Thus, to maximizing the benefit of geotechnical information, a document management system is needed to replace with the electronic version. The geotechnical SI reports are electronically upload, store and available to access, which creating a means for field engineers and authorized consultants using the system. According to Okunade (2010) the geotechnical databases has been developed for units of different area ranging from individual project sites, to cities or municipal areas, counties, states countries and regions consisting of several countries or whole continents.

Conglomomerate Green Project App

Haslan bin Ottot, Kilishamini Pandian, Siew Ke Lin
Universiti Malaysia Sarawak

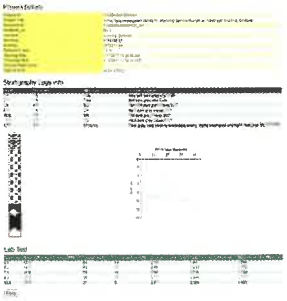
The Project is an innovation to be applied to a residential area in making 3R a practice thus ensuring effective management of recyclables waste. This app will benefit the community that purchasing and using the system in ensuring regular income and more participation towards 3R project by the community, including those at the younger age.

Information & Communication Technology

Consolidated SI Information for Sarawak Soil Database

Norazzlina bt M. Sa'don, Bong Chih How, Louisa Dubah Anak Hubert Chunggat, Stephanie Chua Hui Li, Siti Noor Linda bt Taib, Linda Wong Lin Juan, Abdul Razak bin Abdul Karim
Universiti Malaysia Sarawak

(i) Location of Borehole in Google Street



(ii) Data Entry Webpage

The project aims to develop a digitized database system for Sarawak SI report, which enables data to be retrieved fast with the efficient search. The SI data of 1000 points are targeted, which consists of the Geotechnical site information, which includes location, borehole logs, field and laboratory testing data. The main objectives of the project are to collect, store and manage all identified Geotechnical information gathered from the locally available borehole logs collected are reliable to be used and re-used for planning of infrastructure developments; making preliminary design estimates for earthwork/foundation assessment; and to compile and digitized all recognized Sarawak borehole logs for future decision making without required to perform detailed SI and early identification of potential areas for construction purposes. Besides, the project is also intended to realize a web-based application to allow users to search, view and download the available ground information efficiently.

Technology & Engineering

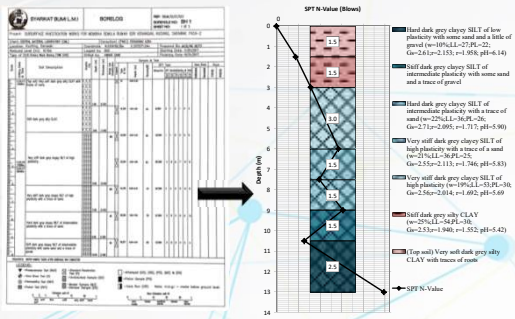
Consolidated SI Information for Sarawak Soil Database: @SARAWAK-SOIL

Product Description

- A digitized database system for Sarawak Geotechnical SI report, which enables data to be retrieved fast with the efficient search.
- The SI data of 1000 points are targeted, which consists of the Geotechnical site information, which includes location, borehole logs, field and laboratory testing data.

Problem Statement

- Most of the SI data are available in the form of hardcopy reports, which is time consuming and often frustrating, especially when the required report or data cannot be found.

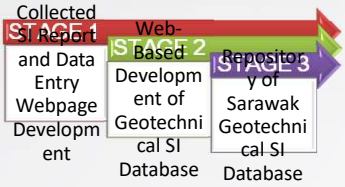


Novelty/Invention

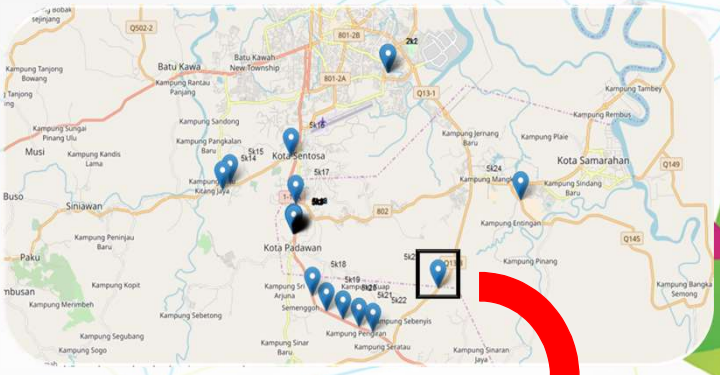
- To digitized recognized Sarawak borehole logs through realizing a web-based application to allow users to search, view and download the available ground information efficiently.
- To preliminary estimation of the volume of soil and rock materials or perhaps for future development to recommend the preliminary route for roads or foundation system for buildings and other structures in terms of Geotechnical considerations, which will save the users a lot of time, labour and money.

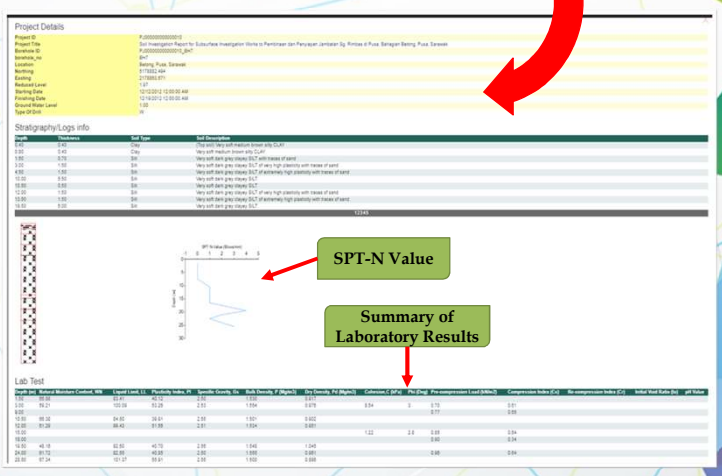
Intellectual Property

- Intellectual Property Disclosure:
  Application in Process – ID: 11064



@Sarawak-Soil





Commercial Potential

- The Geotechnical SI Database system **@Sarawak-Soil** can be deployed as a web-based system and can be accessed anywhere through the computer and smart phones with internet access.
- Benefit to:
  - Local authority/government agencies;
  - Civil engineering consultants & contractors;
  - Universities, researchers and local community.

Researchers:
Ir. Dr Norazzlina M.Sa'don, Ir. Dr Abdul Razak Abdul Karim
Dr Bong Chih How,Dr Stephanie Chua Hui Li,
Assoc. Prof. Ir. Dr Siti Noor Linda Taib, Ms Louisa Dubah Anak Hubert Chunggat & Ms Linda Wong Lin Juan
FEng & FCSIT, UNIMAS

Acknowledgement:
Digital Sarawak CoE (DSCoE): UHSB/B-AM2018/091

InTEX19

Innovation Technology Expo

24-25 July 2019

"Research-Driven Innovation and Technology"

BRONZE AWARD

Awarded to

Norazzlina bt M. Sa'don
Bong Chih How
Abdul Razak bin Abdul Karim
Siti Noor Linda bt Taib
Stephanie Chua Hui Li
Linda Wong Lin Juan
Louisa Dubah Anak Hubert Chunggat

For the invention/innovation of

Consolidated SI Information for Sarawak Soil Database

Prof Dr Lo May Chiun
Chairperson

Universiti Teknologi MARA · UNIMAS Universiti Malaysia Sarawak · SMA Sarawak Multimedia Authority · Swinburne · Curtin University Malaysia

DEVELOPMENT OF CONSOLIDATED SARAWAK GEOTECHNICAL SI (CoSI) DATABASE @SARAWAK-SOIL

M.Sa'don, N.[1], Abdul Karim, A.R.[1], Bong, C.H[2], Wong, L. J[2]. and Hubert Chunggat, L. D[1]

[1]Faculty of Engineering, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak
[2] Faculty of Computer Science and Information Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak
Corresponding author: M.Sa'don, N.[1] msazzlin@unimas.my

Abstract. The development of digitized Consolidated Sarawak Geotechnical Site Investigation (CoSI) database aim to enables information to be stored in a digital format rather than static images and retrieved fast with the efficient search. The Sarawak Geotechnical SI database @Sarawak Soil is function of a database management system, which consists of the site information; includes the project name, location (division), borehole logs, field and laboratory test results. The main objectives of the project are to collect, store and digitized all reliable Geotechnical SI data gathered from the local authority and consultants. The digitized database would be enormous value for future planning of infrastructure developments; making preliminary design estimates for earthwork/foundation assessment; and future decision making with early identification of potential areas for construction purposes, which will produce an economic and safe design. The SI plays an important role, where the inadequate characterization of the subsurface conditions will contribute to either a significantly over-designed solution, which is cost-effective, or an under-designed, which lead to potential failures. In addition, the project is also intended to realize a web-based application to allow users to search borehole, view bore-logs and provides digital downloadable boreholes data of the available ground information in a standard format for analysis. At present most of the SI data are available in the form of hardcopy reports, which is time consuming and often frustrating, especially when the required report or data cannot be found. In summary, the Sarawak Geotechnical Site Investigation (SI) database system, later known as @Sarawak-Soil which stored in a digital format rather than as static images are deployed as a web-based system. This provides many opportunities to explore the data and can be accessed anywhere through the computer and smart phones with internet access.

1. Introduction

The geotechnical site investigation (SI) is routinely performed to the commencement of any projects prior to the proper design, the efficient and economical construction of all civil engineering and building works. The geotechnical engineers will be interpreting the subsurface conditions based on the SI report for both planning and design stages as well as during construction. The SI plays an important role, where the inadequate characterization of the subsurface conditions will contribute to either a significantly over-designed solution, thereby increasing the project cost, or an under-designed, which lead to potential failures. It is also helps to overcome any possible difficulties delays that may arise during construction period, disputes, claims and project cost overruns due to ground and other local conditions (Zumrawi, 2012 and Jaksa et.al 2003).

Perbadanan Harta Intelek Malaysia
Intellectual Property Corporation of Malaysia
(Diperbadankan)
Unit 1-7 & Mezzanine, Unit 12, 12A, 13, 15, 16, 17, 18, dan 19
Tower B Menara UOA Bangsar, No. 5, Jalan Bangsar Utama 1
59100 Kuala Lumpur
Tel : +603-22998400 Faks: +603-2299 8989
Laman Sesawang : www.myipo.gov.my

LO MAY CHIUN
UNIVERSITI MALAYSIA SARAWAK
94300 KOTA SAMARAHAN
SARAWAK

RECEIVED
20 FEB 2020
RIEC

LCR01

NOTIS PEMBERITAHUAN HAK CIPTA

(Seksyen 26B, Akta Hak Cipta 1987)

Tuan/Puan

Sukacita dimaklumkan, maklumat butiran Pemberitahuan Sukarela Hak Cipta tuan/puan telah direkodkan ke dalam Daftar Hak Cipta sebagaimana diperuntukkan di bawah Seksyen 26B, Akta Hak Cipta 1987. Butiran Pemberitahuan Hak Cipta tersebut dirujukkan seperti berikut:

TARIKH PERMOHONAN	**: 04/11/2019**
NO. PERMOHONAN	**: LY2019007026**
NO. PEMBERITAHUAN	**: CRLY00021650**
TAJUK KARYA	**: CONSOLIDATED SI INFORMATION FOR SARAWAK SOIL DATABASE**
KATEGORI KARYA	**: SASTERA**
TARIKH PENERBITAN PERTAMA	**: 24/06/2019**
PENCIPTA	**: NORAZZLINA BT M.SA'DON ABDUL RAZAK BIN ABDUL KARIM BONG CHIH HOW**
PEMUNYA	**: UNIVERSITI MALAYSIA SARAWAK**
PEMEGANG LESEN	**: TIDAK BERKAITAN**

Tuan/Puan boleh memohon Sijil Pemberitahuan Hak Cipta dengan mengemukakan Borang CR-5 seperti dikepilkan bersama. Pihak tuan/puan juga boleh memohon petikan yang diperakui sah daripada Daftar Hak Cipta yang boleh dijadikan satu keterangan *prima facie* mengenai butiran yang direkodkan.

Sukacita dimaklumkan juga, sekiranya terdapat sebarang perubahan maklumat sedia ada, pihak tuan/puan dinasihatkan kemukakan maklumat perubahan tersebut untuk direkodkan dalam Daftar Hak Cipta.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(MAWAR HARTINI MD MAZLAN)
b.p. Pengawal Hak Cipta
Perbadanan Harta Intelek Malaysia
Tarikh: 11/02/2020

Form E - Financial Progress Report v.1/2019

FINANCIAL PROGRESS FOR SARAWAK DIGITAL ECONOMY RESEAR

NAME OF INSTITUTION: UNIVERSITI MALAYSIA SARAWAK

PROGRESS PERIOD: '01 September 2019 - 29 February 2020

PROJECT LEADER		Ir. Dr Norazzlina M.Sa'don		
PROJECT TITLE		Consolidated SI Information for Sarawak Soil Database		
PROJECT DURATION	START DATE	01/09/2018	END DATE	31/08/2019
PROJECT STATUS		Active		
TOTAL GRANT APPROVED/ALLOCATION (RM)		100,000.00		
V11000		66,063.00		
V21000		2,000.00 (1800-Conference Fee)		
V23000				
V24000				
V27000		1,959.18		
V28000				
V29000		14,800.00 (5000-Publication Fee)		
V35000				
VIREMENT		TO VOTE	FROM VOTE	AMOUNT
TOTAL SPENT (RM)		84,822.18		
BALANCE AFTER DEDUCTION (RM)		15,177.82		
SPENDING PERCENTAGE (%)		84.8		

*Highlighted in RED pending payment

VERIFIED BY,

PROJECT LEADER

NAME: Ir. Dr Norazzlina M.Sa'don

OFFICIAL STAMP: Senior Lecturer
Faculty of Engineering
UNIMAS